

FUSED QUARTZ ARTICLE HAVING CONTROLLED DEVITRIFICATION

Abstract of Disclosure

A fused quartz article, such as a muffle tube or crucible, with enhanced creep resistance. The enhanced creep resistance is the result of controlled devitrification of the fused quartz article. Controlled devitrification is achieved by coating the article with a colloidal silica slurry doped with metal cations, such as barium, strontium, and calcium. The metal cations in the slurry promote nucleation and growth of cristobalite crystals into the fused quartz at temperatures in the range from about 1000 ° C to about 1600 ° C. The cristobalite has significantly higher viscosity, and therefore greater creep resistance at elevated temperatures, than fused quartz. Methods for applying a doped coating to a fused quartz article and improving the creep resistance of a fused quartz article are also disclosed.

Figures

1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.